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ABSTRACT

This paper describes a Web-based question-answering system called E-teacher that can be used in both traditional and distance learning courses to review academic contents. E-teacher is a self-editing template-based system that consists of a set of PHP scripts that generate the HTML code dynamically, or "on the fly." The entire E-teacher is managed through an ACCESS database located on a Web server and data are stored and recovered upon request. E-teacher was developed to help students review course content and reinforce the knowledge gained during traditional or distance learning courses. E-teacher will be piloted in English courses offered at the Facultad de Telematica of the Universidad de Colima (Mexico). (Author)

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A New Tool for Managing Students Self-Evaluations in Traditional and Distance Education Courses

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Abstract

This paper describes a web-based question-answering system called E-teacher that can be used in both traditional and distance learning courses to review academic contents. E-teacher is a self-editing template-based system which consists of a set of PHP scripts that generate the HTML code dynamically, or "on the fly." The entire E-teacher is managed through an ACCESS database located on a Web server and data are stored and recovered upon request. E-teacher was developed to assist students review course content and reinforce the knowledge gained during traditional or distance learning courses. E-teacher will be piloted in English courses offered at the Facultad de Telemática of the Universidad de Colima.

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Introduction

Since the early 90's teachers have recognized the potential of the World Wide Web (WWW) as an instructional tool (Crossman, 1997). As a consequence of this, they have created different types of educational materials to be exploited on the WWW, including text documents, multimedia presentations, etc. Unfortunately, this medium (online teaching) does not allow interactivity with instructor and class materials in the same manner as face-to-face contact permits. Even though the importance of these types of interaction (student-contents and student-interface) has been highlighted by Moore (1989) and Hillman (1994). This shortcoming often represents a major disadvantage when reviewing class content for self-evaluation purposes; because as Barker (1994) mentions, interactivity in learning is a necessary and fundamental mechanism for knowledge acquisition and the development of both cognitive and physical skills.

With this difficulty in mind, we developed a prototype of a Web-based question-answering system, called E-teacher, to complement online and traditional courses in facilitating students' self-evaluations and review course materials.

E-teacher is a template-based system which is managed though an ACCESS database (http://www.microsoft.com), where data are captured and retrieved upon request. The system will be integrated into distance education courses offered by the Facultad de Telemática of the Universidad de Colima (FT), in Colima, México (http://telematicanet.ucol.mx). E-teacher is composed of nine activities that can be used as independent modules or in combination and can be easily integrated within online courses

E-teacher will be piloted by English as a Second Language (ESL) professors at the FT as a complementary tool in their face-to-face courses. The implementation of this Web-based question-answering system will make student self-evaluations and the interactivity with the course materials easier and more efficient. In contrast to other simple strategies for handling student questions, such as bulletin boards, newsgroups, listservs, and e-mail, this system has a set of modules to increase the interactivity of students with course materials. For instance, E-teacher has a module that rates the performance of each individual student, based on random exercises and exams for their personal use without recording any data about the results. The activities for students within this system and their full descriptions are listed on table 1.

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Activity	Description
WordScramble	The system randomly misarranges the letters within a response, which students must appropriately order to reproduce the correct answer.
SentenceScramble	The system randomly misarranges the syntax of a sentence or phrase, which students must appropriately order to reproduce the correct answer.
MatchCols	The system produces two columns which students must correctly correlate.
Fill	The system produces sentences or paragraphs with spaces which students must complete with the correct response.
SingleChoice	The system produces multiple choice questions with between two and ten options with a single correct choice.
MultiChoice	The system produces multiple choice questions with between two and ten options with an equal number of possible correct choices.
Dialog	The system misarranges elements (dialogs, processes, etc.) within two columns which students must correctly order.
Random	The system accesses the database of the type of exercise the student chooses (Fill, MatchCols, etc.) to randomly produce exercises from all the categories contained within that specific database.
Exams	The teacher selects a maximum of 20 questions from the 7 different question-type databases (Fill, MatchCols, etc.). Students then select any number of practice tests the teacher has previously captured.

Table 1. Different type of activities on e-teacher

Description of the question-answering system

The E-teacher system consists of a set of PHP files that generate all the HTML code dynamically. This PHP code handles all the operational tasks. The files reside in an Apache Web Server operating in a Windows 2000 server with a PHP module version 4.0. In addition, the system is also installed on a pc running under the Linux operating system. The database that handles all the files can be accessed transparently through ODBC in any platform that supports this open database connectivity. The system consists of student, teacher and administrator modules.

The E-teacher is an open system for students. Any student can access the system to review course materials independently of the topic or teacher. Teachers, however, must be registered by the system to add, modify or delete review materials. In figure 1. we show the main screen for the E-teacher system.

It is important to mention that students can not modify the contents, graphic interface or functionality of the system. This can only be done by the teacher(s) who possess the access code previously authorized by the administrator of the system.

Bienvenido!
En este sistema los alumnos pueden acceder a actividades interactivas para el aprendizaje. Las actividades creadas por sus propios maestros, están desarrolladas con el enfoque pedagógico de resolución de problemas, es decir, el Sistema de Enseñanza propone problemas linguísticos que el alumno, de manera interactiva, debe resolver.
Durante la actividad el sistema ofrece apoyos en línea que incluyen retroalimentación e hipervínculos a páginas de apoyo. Al finalizar la actividad el sistema proporciona una evaluación para que el alumno pueda medir sus conocimientos.
Favor de seleccionar la sección:
Haz clic aquí

Fig. 1. E-teacher main screen

In the main screen, students can select the review material they want to access. As a test, we offer two different courses, English and Biology. Once they select the review material, the activities screen for that material is displayed as previously personalized by the teacher. This is shown in fig 2. In this Figure the topic the student selected was Biology. Once the student accesses the activities page, he can select among the options the instructor has previously developed (the different options are mentioned in table 1), as well as the individual exercises or exams he wishes to practice. Again, as a test we offer review material about the Cell. Within each activity, students have several standard and optional selections. Each of the standard options and its description is listed in table 2. In table 3 we list the optional selections, depending on the additional information teacher wish to provide.

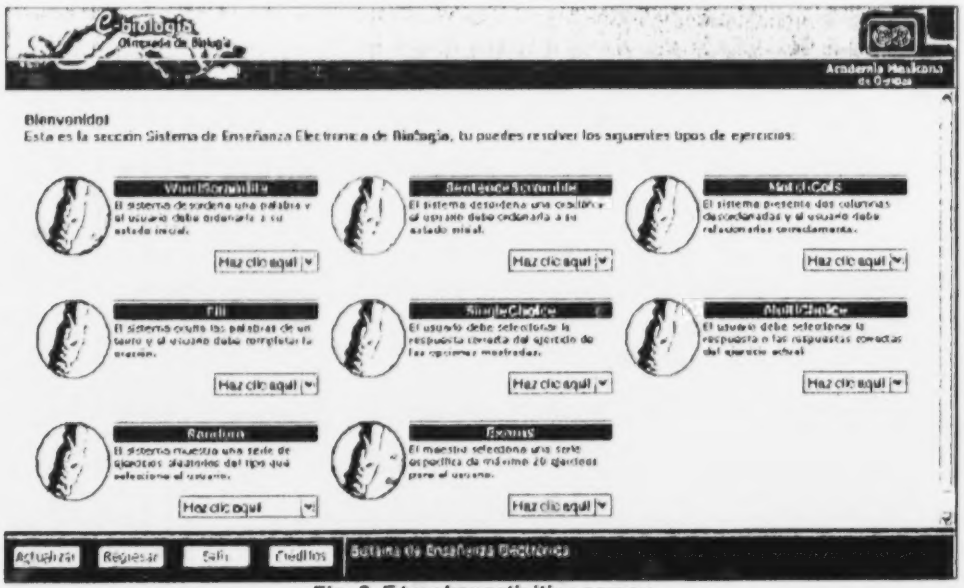

Fig. 2. E-teacher activities screen

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Option	Description
Menu	Returns students to the activities main screen.
Instructions	Provides specific instructions on how to resolve the item
Review	Provides feedback about the degree of accuracy of the response
Next Item	Provides student with a new item
Resolve	Provides the correct response.

Table 2. List of standard selections for students.

One important characteristic is that teachers can provide students with several levels of difficulty depending on whether or not they wish to incorporate the optional selections. Teachers can incorporate these options in the teachers' main screen. Table 3 shows the different optional selections available to teachers:

Option	Description
Hint	Presents additional information to assist students resolve the item
Tip	Offers the next correct step needed to solve the item
Lesson	Provides a hyperlink to relevant pages related to the contents of the review material.

Table 3. List of optional selections for students

In figure 3, we show the SentenceScramble activity to review material about the Cell. In this activity, students have to select the correct word and place it in the correct syntactic order. As they order the phrase, they can ask the system for help, pressing the "Hint", "Tip", or "Resolve" buttons. Depending on how many times they press these buttons, the system calculates an average score for each answer and, upon finishing the activity, provides a total score.

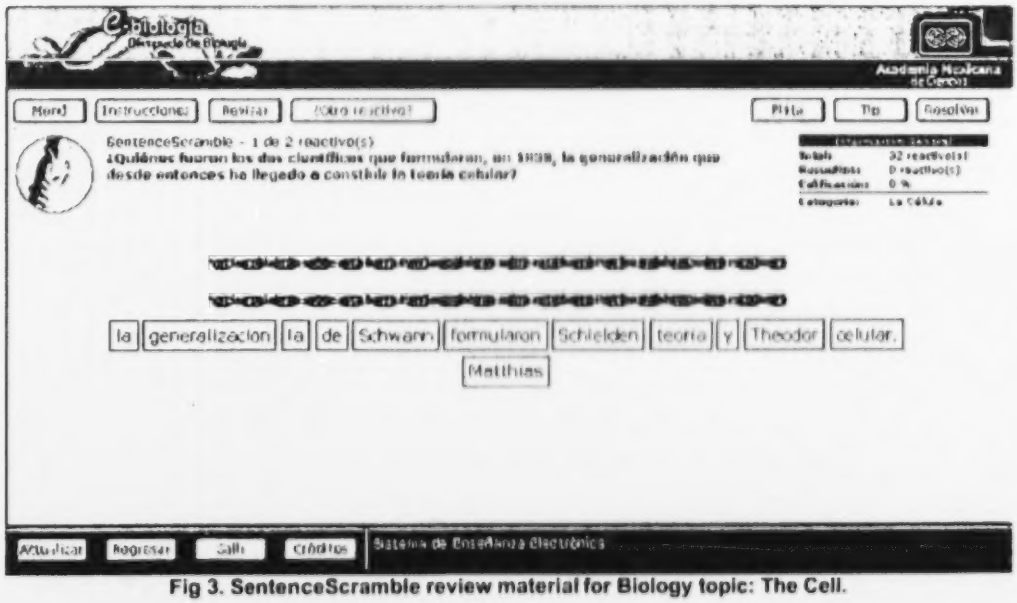

Fig 3. SentenceScramble review material for Biology topic: The Cell.

In table 4, a brief description of the options that teachers can select for a specific activity is shown. In Fig. 4 we show the graphical view of these options.

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Option	Description
General Information	Displays the general information and the summary of lesson exercises incorporated by the teacher and his privileges
Exercises categories	Creates the databases needed to present the review activities as a coherent suit.
Individual Examinations and Exams	Creates individual activities that can be included in the Random and Exams databases for either review or inclusion in practice tests.
Change Colors for Instruction	Suggests a variety of color combinations teachers can use as backgrounds for their activities.
Change Interface Information	Individualizes information within the system, according to teacher requirements
Administer Lessons (hypertexts)	Creates a hyperlink database where the teacher can select hyperlinks to provide additional information (i.e. readings, diagrams, etc) to help students solve items, provide additional information or otherwise promote leaning.
Activate/Deactivate Tips	Allows the teacher to activate or deactivate the tips captured in the database, allowing for different degrees of difficulty.
Activate/Deactivate Hints	Allows the teacher to activate or deactivate the hints captured in the database, allowing for different degrees of difficulty.

Table 4. Different options that appear on the teacher main menu

Fig. 4. The teacher main menu

Conclusions

The fast and increasing development of distance education courses via the World Wide Web has made the development of computer systems that increase the interactivity of students-contents and students-interface necessary. With this goal in mind, we have developed a system based on a set of PHP scripts and templates to help students review materials and to realize self evaluations with a high level of interactivity with the course content. It is our hypothesis that this system will help students increase their cognitive and physical skills on the material they review.

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To prove this, our future work, will consist in piloting the system with several English as a Second Language courses that are taught at the Facultad de Telemática of the Universidad de Colima in México to evaluate the system within an actual educational context and determine any possible improvement in the development of language skills in first year students.

In addition, we are also considering the addition of a new student-student, teacher-student interaction module that will permit students in online courses to interact among themselves and help increase the community feeling for this type of courses.

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